Ethics in Automotive Engineering

Implementation and reflections

Jonas Sjöblom, M2 Chalmers
Karl Persson Fine de Licht, RISE

Outline

- Background
- Ethics exercise in MTF240 (Internal Combustion Engines)
- Results & Reflections
- Discussions

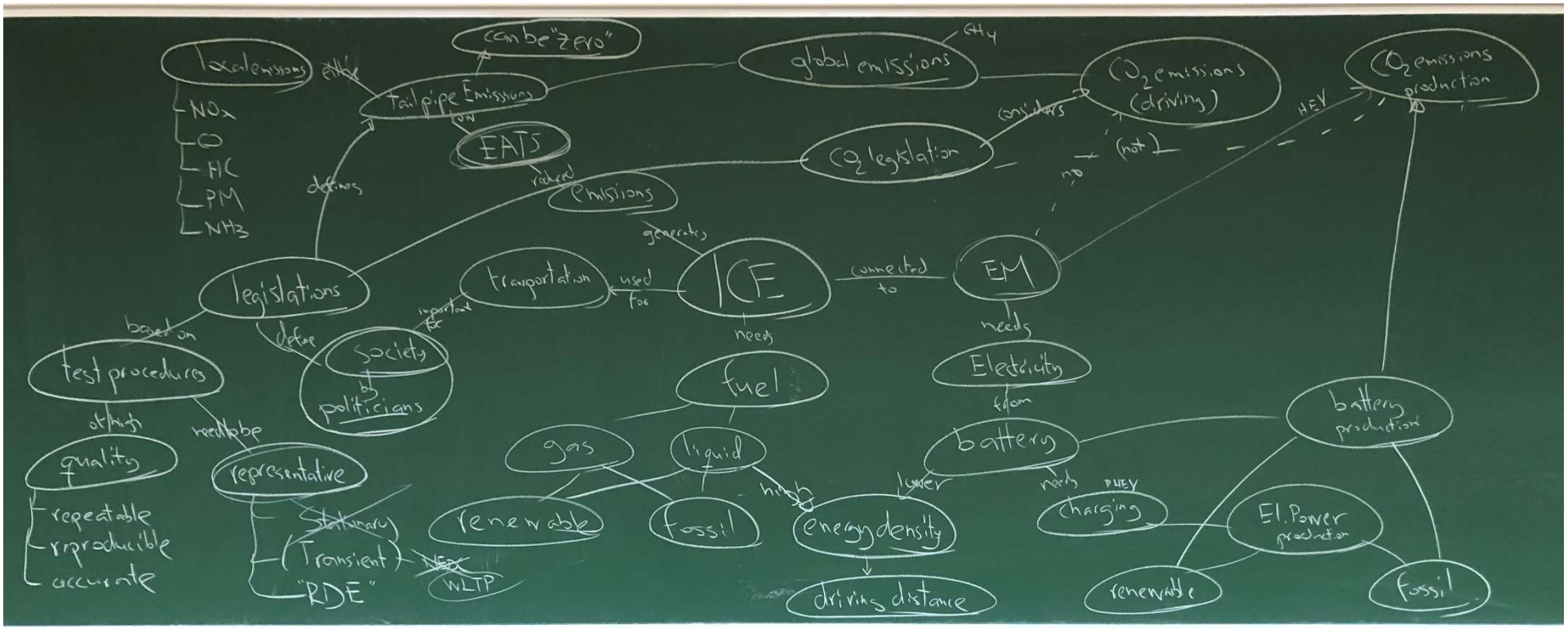
Background – the Automotive perspective

- The role of the internal combustion engine (ICE)
  - Enabler of transportation and societal growth
  - Impact on the environment and human health (globally and locally)
- Students from Masters Programme Automotive Engineering (MPAUT)
  - Will work in a world of change
  - In a society with increase in ethical conflicts/dilemmas

Ethics exercise in MTF240

- Ethics in Masters programme Automotive Engineering (MPAUT)
  - In many MPAUT courses (~75%, 2016)
  - MTF240 (Internal Combustion Engines)
    - Lab exercise demonstrating engine calibration
    - Performed twice (SP1 2017, 2018)
    - Learning objective: “reflect on the role of internal combustion engines for transports in society as well as the emissions issue.”
- Teaching and Learning Activities
  - Lecture & personal reflection (concept map)
  - Ethical reflection “recipe” (from Karl Persson de Fine Licht)
  - “One-page assignment”

Lecture topics



concept map from 2018-09-24

“One-page assignment”

- Choose one of three “cases” (“inspired” from diesel gate)
  - Connected to engine calibration (where basics are taught in the course and demonstrated during the lab)
  - Engineering trade-offs with an “ethical twist”
- Hand in of PM
  - Work in pairs
  - Automatically checked for plagiarism

Example “case 1” – 2019 (VW-owner)

Martin works as an engineer at car manufacturer company in Sweden.

In 2014, he bought a diesel car, VW Passat and he has been very satisfied with this vehicle. It is very quick during acceleration and it has a fuel consumption that is much closer to the listed value compared to many other brands. During the autumn 2015, the “diesel gate” exploded and now Volkswagen send out invitations for **exchange of the engine software**. Volkswagen claims that there will be no loss in performance.

However, since Martin took the course in ICE during his Masters, he remembered that NOx emissions increased with thermal efficiency and **suspects that what VW claims is probably not 100% true**.

Martin commutes for 1 hour single trip and spends quite a lot of money on diesel fuel and he also **enjoys the good performance** of the Passat (although a station wagon…). Since the Transportation authority (Trafikverket) will not check if he makes the update or not (their responsibility concerns traffic safety **but not the environment**),

he considers not to visit the garage for the update. **What should Martin do?**

"Recipe" for Writing a reflection using the Generic model

Adapted from Karl Persson Fine de Licht

1. Who is the agent/Who is making the decisions? (here it's given: you)
2. What are the alternatives? (Depends on who is the agent)
3. Who is affected by the alternatives and how?
4. What are the consequences of the different alternatives?
5. What are the values at stake (given different normative views)?
6. How can different values that (potentially) are in conflict be weighed together?

Step 3: Argument(s) against your decision. The argument(s) against your decision should be worth taking seriously and you should also show how these arguments can be handled

Step 2: Argument(s) in favour for decision

Step 1: Make a decision! (And there will be no "right or wrong"

Student voices

- Course evaluation
  - 2017: 3,91
  - 2018: 3,85
- Comments (2017, 2018):
  - I don't see the relevance of it being included in the program
  - “Interesting, after doing the analysis I actually changed my mind”
  - Good to start to think of ethics
  - It is interesting since you do not usually put so much focus on that topic as one might should. Very different from my former university!
  - I really liked this assignment, because it gave good insight into ethics of internal combustion engines.
  - Good to use the “recipe” to understand the different consequences for different options
  - Important that the cases are timely (up to date)

Results, reflections from examiner / MPA perspective

- Rewarding reading
  - The “recipe” works!
  - Everyone approved (a few revisions needed every year)
  - Many still students tries to get “one golden” answer (although the task was aiming at “simple” yes/no decision)
- Integration of ethics in existing course
  - Appropriate (low) amount of effort from students
  - Difficult to increase ambitions? (teacher competence, student work load)
- Hopes for the future (?)
  - Will they reflect upon ethical dilemmas in their careers?
  - Will they remember this simple method?
  - No MPAUT from Chalmers will contribute to future “scandals”
- Great collaboration with Karl!
  - Discussions during development, supporting approach

Future work

- Questions? Discussion?